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Avaya Inc.  
Docket Administrator (Room 1L-202)  
P.O. Box 629  
101 Crawfords Corner Road  
Holmdel, NJ 07733

EXAMINER

STRANGE, AARON N

ART UNIT PAPER NUMBER

2153

DATE MAILED: 02/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/718,143

Applicant(s)

SHABTAY, LIOR

Examiner

Aaron Strange

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 19,23 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. With regard to claim 19, the term "substantially" in line 2 renders the claim(s) indefinite because it is unclear what information not included in the packet as it was received the Applicant intends to be used for creation of the entry. The Office recommends that the term "substantially" be removed from the claim.
4. Claim 23 recites the limitation "the received packet" in line 3. There is insufficient antecedent basis for this limitation in the claim. It is unclear whether the received packet is directed to/from the original load balancer or to/from the additional load balancer. For the purpose of applying prior art, the received packet has been interpreted as being directed to/from the additional load balancer.
5. With further regard to claim 23, it is unclear whether the claimed steps are intended to be modifications of prior steps or additional steps in the method in claim 13. The Office recommends that the Applicant change the preamble to state -- method according to claim 13, further comprising --. For the purpose of applying prior art, the steps have been interpreted as additional steps of the method in claim 13.

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6. Claim 24 recites the limitation "the received packet" in line 6. There is insufficient antecedent basis for this limitation in the claim. It is unclear which packet the Applicant is referring to. For the purpose of applying prior art, the received packet has been interpreted as a packet directed from the load balancer to a server, which is received by the accelerator.

7. With further regard to claim 24, it is unclear whether the claimed steps are intended to be modifications of prior steps or additional steps in the method in claim 13. The Office recommends that the Applicant change the preamble to state -- method according to claim 13, further comprising --. For the purpose of applying prior art, the steps have been interpreted as additional steps of the method in claim 13.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 13,14,15,17,28,32,37 and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Brendel et al (US 5,774,660).

10. With regard to claim 13, Brendel et al. disclose a method of creating an entry in a list which correlates between packet groups and respective destination servers, comprising: receiving, by an accelerator, a packet directed from or to a load balancer which changes at least the destination IP address of the packets it forwards to servers

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(Real IP address replaces virtual IP) (Col 16, Lines 55-63); and creating, by the accelerator, an entry in the list of destination servers (session table), responsive to the received packet (Col 12, Lines 6-24). The load balancer disclosed by Brendel et al. performs the functions of an accelerator as disclosed by the Applicant, since it enters a "pass-through" state which forwards successive packets from the client directly to the assigned server, without load balancing them (Col 12, Lines 59-63).

11. With regard to claim 14, Brendel et al. further disclose that creating the entry comprises creating an entry which does not include a destination address of a web site (The real IP is used to identify the destination servers. The web site destination address is the virtual IP address) (Col 7, Lines 14-29)

12. With regard to claim 15, Brendel et al. further disclose that the packet is directed to or from a load balancer operating in half NAT mode (The virtual IP is replaced with a real IP address, but the source address is not changed) (Col 16, Lines 55-63).

13. With regard to claim 17, Brendel et al. further disclose that receiving the packet comprises receiving a packet directed from the load balancer to a server (Packet is forwarded to a server) (Col 12, Lines 55-58).

14. With regard to claim 28, Brendel et al. disclose a load balancing accelerator, comprising: an input interface which receives packets directed to a load balancer (packets are routed to the load balancer) (Col 12, Lines 13-17); a table which lists packet groups and their respective destination servers, the table having physical entries which can accommodate different field sets for storage of data entries (session table) (Col 12, Lines 6-24); a comparator which compares at least one of the packets directed

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to the load balancer to one or more of the data entries of the table (determine whether a packet is from a session in the session table); a forwarding unit which forwards at least one of the packets for which a match was found by the comparator, directly to a server, responsive to the contents of the matching data entry (Further packets from the same session are passed through without being load balanced) (Col 12, Line 59 to Col 13, Line 16); and a controller which determines in which field set, from the plurality of different field sets, each of the data entries of the table is stored (The load balancer creates an entry in the session table).

15. With regard to claim 32, Bayeh et al. further disclose that the controller determines the field sets in which the data entries of the table are stored, such that at a single time all of the data entries are stored in the same field sets (session table entries) (Col 12, Lines 13-17).

16. With regard to claim 37, Brendel et al. disclose a load balancing accelerator, comprising: an input interface which receives packets directed to a load balancer (packets are routed to the load balancer) (Col 12, Lines 13-17); a table which lists packet groups and their respective destination servers (session table) (Col 12, Lines 6-24); a comparator which compares at least one of the packets directed to the load balancer to at least one of the entries of the table (determine whether a packet is from a session in the session table); a forwarding unit which forwards directly to a server, at least one of the packets for which a match was found by the comparator, responsive to the contents of the matching entry (Further packets from the same session are passed through without being load balanced) (Col 12, Line 59 to Col 13, Line 16), the

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forwarding unit being capable of operating in a plurality of operation modes (half NAT or triangulation), at least one of the operation modes including changing at least one of the fields of the forwarded packets (Real IP address replaces virtual IP) (Col 16, Lines 55-63). A controller which determines in which mode the forwarding unit operates is inherent to the system disclosed by Brendel et al. Without a controller to determine the mode of operation, the device could not operate in multiple modes since it would have no way to determine which mode to operate in. Therefore, a controller which determines in which mode the forwarding unit operates is present in the system disclosed by Brendel et al., despite the lack of a specific reference to it.

17. With regard to claim 38, Brendel et al. further disclose that that the forwarding unit is capable of performing splicing (Connection is migrated from the load balancer to the server after it is set up) (Col 11, Lines 64-66)

***Claim Rejections - 35 USC § 103***

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claims 1,2,4, are rejected under 35 U.S.C. 103(a) as being unpatentable over Cisco Systems in view of Bayeh et al. (US 6,098,093).

20. With regard to claims 1,2, and 4, Cisco Systems disclose a method of accelerating the operation of a load balancer by an accelerator switch comprising: receiving, by the accelerator switch (Catalyst 6000), packets directed to the load balancer (Page 9, Lines 14-18); determining, for at least one of the received packets, whether the packets match an entry of a list of packet groups (Determine if a packet is "subsequent") (Page 9, Line19 to Page 10, Line 2); and forwarding, by the accelerator switch, at least on of the received packets, directly to its destination, responsive to the determining (Subsequent packets are switched without being load balanced) (Page 9, Line19 to Page 10, Line 2). However, Cisco Systems fail to disclose the specific number or identity of parameters compared to respective fields of entries of the list.

Bayeh et al. teach the use of session identifiers to allow sessions to be maintained in a load balancing environment. Session identifiers uniquely identify each session and are sent by the client as part of the request packets (Bayeh et al. Col 3, Lines 5-19). Session identifiers provide a simple method of uniquely identifying a session between a client and server.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use session identifiers as disclosed by Bayeh et al. as the comparison parameter to determine whether the packets match an entry in the list, and subsequently forward the packet directly to its destination. The use of session identifiers provides a unique identifier for each session, and requires the comparison of only a single parameter. This speeds up the operation of the accelerator and reduces the overall latency of the connection.



21. Claims 1,2,3,5,6,7,8,9,10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cisco Systems in view of RFC 2391.

22. With regard to claims 1,2, and 3, Cisco Systems disclose a method of accelerating the operation of a load balancer by an accelerator switch comprising: receiving, by the accelerator switch (Catalyst 6000), packets directed to the load balancer (Page 9, Lines 14-18); determining, for at least one of the received packets, whether the packets match an entry of a list of packet groups (Determine if a packet is "subsequent") (Page 9, Line19 to Page 10, Line 2); and forwarding, by the accelerator switch, at least on of the received packets, directly to its destination, responsive to the determining (Subsequent packets are switched without being load balanced) (Page 9, Line19 to Page 10, Line 2). However, Cisco Systems fail to disclose the specific number or identity of parameters compared to respective fields of entries of the list.

HTTP uses TCP as a transport and RFC 2391 discloses that TCP connections are defined using source/destination addresses and source/destination ports (Page 4, Lines 5-7). A TCP connection can be uniquely identified using only these parameters. An accelerator operating in conjunction with a load balancer for a web site server cluster only needs to handle HTTP connections. In order to identify which server to send the request to, the accelerator needs to look only at the source IP and port to determine which connection the packet belongs to. Once the correct connection is determined, the packet can be properly routed to the correct server. Comparing only these parameters

speeds up the operation of the accelerator since unnecessary parameters are not being compared.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use the source IP and source port as the comparison parameters to determine whether the packets match an entry in the list. These two parameters uniquely identify a connection and comparing only those parameters speeds up the operation of the accelerator since unnecessary parameters are not compared.

23. With regard to claim 5, Cisco Systems further disclose that receiving packets directed to the load balancer comprises receiving packets directed from a client to a Web site (Page 1, Lines 12-14) associated with the load balancer and forwarding at least one of the received packets directly to its destination comprises forwarding the packets from the clients to one of the servers of the Web site without passing through the load balancer (Page 9, Line 28 to Page 10, Line 2).

24. With regard to claims 6 and 7, as discussed regarding claims 1,2, and 3, determining whether the packets match an entry of the list comprises comparing the source IP address and source port of the packets to respective fields in the list, wherein the compared parameters do not include a destination address (only the source IP and source port are compared).

25. With regard to claim 8, Cisco Systems further disclose that receiving packets directed to the load balancer comprises receiving packets directed from a server to a client and forwarding at least one of the received packets directly to its destination

comprises forwarding the packets from the server to the client without passing through the load balancer (Page 10, Lines 5-12).

26. With regard to claim 9, while the system disclosed by Cisco Systems shows substantial features of the claimed invention (discussed above), it fails to disclose that determining whether the packets match an entry of the list comprises comparing the destination IP address and destination port of the packets to respective fields in the list.

However, since the source IP and source port are used for identifying the connection associated with an incoming packet, it would be advantageous to use this same identification means for identifying the connection associated with outgoing packets. The source IP and source port of an incoming packet in a connection is the same as the destination IP and destination port of an outgoing packet in the same connection.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use the destination IP and destination port as the comparison parameters to determine whether the packets match an entry in the list. This information is already used to identify the connection associated with an incoming packet and it would be obvious to use the same information to identify the connection associated with an outgoing packet. This would reduce the size of the list required to map the clients and servers.

27. With regard to claim 10, as discussed regarding claim 9, the compared parameters do not include a source address since only the destination IP and destination port are compared.

28. With regard to claim 11, Cisco Systems further disclose that forwarding at least one of the received packets comprises forwarding packets for which a matching entry was found (Packets bypass the load balancer after the SLB flow has been validated) (Page 9, Line 18 to Page 10, Line 2).

29. Claims 1,12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brendel et al. (US 5,774,660) in view of Bayeh et al. (US 6,098,093).

30. With regard to claim 1, Brendel et al. disclose a method of accelerating the operation of a load balancer by an accelerator switch comprising: receiving, by the accelerator switch, packets directed to the load balancer (Col 12, Lines 7-17); determining, for at least one of the received packets, whether the packets match an entry of a list of packet groups (session table); and forwarding, by the accelerator switch, at least one of the received packets, directly to its destination, responsive to the determining (Subsequent packets of a session are forwarded without being load balanced)(Col 12, Lines 59-63). However, Brendel et al. fail to disclose the specific number or identity of parameters compared to respective fields of entries of the list.

Bayeh et al. teach the use of session identifiers to allow sessions to be maintained in a load balancing environment. Session identifiers uniquely identify each session and are sent by the client as part of the request packets (Bayeh et al. Col 3, Lines 5-19). Session identifiers provide a simple method of uniquely identifying a session between a client and server.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use session identifiers as disclosed by Bayeh et al. as the comparison parameter to determine whether the packets match an entry in the list, and subsequently forward the packet directly to its destination. The use of session identifiers provides a unique identifier for each session, and requires the comparison of only a single parameter. This speeds up the operation of the accelerator and reduces the overall latency of the connection.

31. With regard to claim 12, Bayeh et al further disclose that the load balancer is operating in half NAT or full NAT mode (Real IP address replaces virtual IP, half NAT) (Col 16, Lines 55-63).

32. With regard to claim 16, while the system disclosed by Brendel et al. shows substantial features of the claimed invention (discussed above), it fails to disclose that the packet is directed to or from a load balancer operating in full NAT mode. As discussed regarding claims 13 and 15, the load balancer operates in half NAT mode. The source address remains as the original client address since replies from the server bypass the load balancer entirely.

However, it would not affect the functionality of the system if full NAT mode were used by the load balancer. The packets would be returned to the load balancer before going to the client, but since the IP address of the client is not used to monitor sessions, it would not affect the functionality of the invention. In cases where full NAT is needed, such as restricting all network traffic to a single entry and exit point for security, it could be implemented without affecting the acceleration process.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to allow the load balancer disclosed by Brendel et al. to operate in full NAT mode. Allowing this mode of operation can provide more security without affecting the acceleration functionality.

33. Claims 18,20,21,22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brendel et al. (US 5,774,660) in view of Cisco Systems.

34. With regard to claim 18, while the system disclosed by Brendel et al. shows substantial features of the claimed invention (discussed above), it fails to disclose that receiving the packets comprises receiving a packet directed from a server to the load balancer. The servers disclosed by Brendel et al. reply directly to the clients, bypassing the load balancer's node entirely.

Cisco Systems teach the creation of entries for packets directed to the load balancer by a server. The process is essentially the same for packets headed to the servers (Page 10, Lines 3-12). When the load balancer is operating in full NAT mode, packets cannot be sent directly to the clients via an alternate route since the addresses of the clients are not known by the server. These packets must be sent back to the load balancer. It would be advantageous to provide acceleration for packets in this direction as well. Furthermore, packets traveling in this direction cannot be load balanced since they must go to the requesting client.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide acceleration for packets traveling from the

servers back to the load balancer as disclosed by Cisco Systems. This would reduce the amount of packets the load balancer would need to examine, speeding up the transmission of packets in this direction.

35. With regard to claim 20, while the system disclosed by Brendel et al. shows substantial features of the claimed invention (discussed above), it fails to disclose that creating the entry comprises creating the entry using information not included in the received packet as it was received. Brendel et al. fail to disclose the specific components of session table entries.

Cisco Systems teaches a method of creating an entry in a session table that uses information from the received packet and information from a copy of the received packet which is forwarded to the load balancer. Cisco Systems disclose that packets which are potential sessions are cached when they are received from the client. The packet is forwarded to the load balancer. If the load balancer changes the destination address in the returned packet, the accelerator validates the flow and completes the entry. All future packets belonging to the same session bypass the load balancer (Page 9, Line 14 to Page 10, Line 2). This method allows for the identification of the beginning and end of individual sessions as well as enables the accelerator to detect the mode of operation of the load balancer based upon the differences between the two packets.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use the method of creating an session entry disclosed by Cisco Systems to create entries in the session table disclosed by Brendel et al. This method allows for the identification of the beginning and end of individual sessions as

well as enables the accelerator to detect the mode of operation of the load balancer based upon the differences between the two packets. The identification information for subsequent packets of the session may then be appropriately chosen based upon the load balancer's mode of operation.

36. With regard to claim 21, as discussed regarding claim 20, creating the entry comprises creating the entry using information from a copy of the received packet, previously received by the accelerator.

37. With regard to claim 22, as discussed regarding claims 20 and 21, creating the entry comprises receiving a packet from the load balancer and creating the entry comprises creating an entry using information from the received packet and from a copy of the received packet forwarded to the load balancer.

38. With regard to claim 24, while the system disclosed by Brendel et al. shows substantial features of the claimed invention (discussed above), it fails to disclose the storing of identification information and values of one or more parameters of the packets directed to the Web site, in a temporary storage; and searching the temporary storage for an entry which matches the received packet from the load balancer, wherein creating the entry in the list of destination servers of packets groups is performed only if a match is found.

Cisco Systems teach the process of storing identification information and values of one or more parameters of the packets directed to the Web site in a temporary storage (cache flow information of potential session); and searching the temporary storage for an entry which matches the received packet from the load balancer (look to



see if received packet matches cached information); wherein creating the entry in the list of destination servers of packets groups is performed only if a match is found (modified packet received from load balancer triggers creation of valid entry) (Page 9, Line 14 to Page 10, Line 2). This process ensures that only valid sessions are entered into the table, reducing the amount of session entries. This also prevents invalid sessions from taking entries in the table away from valid sessions, increasing the efficiency of the accelerator.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to modify the system disclosed by Brendel et al. to use a temporary storage to hold information about potential sessions. Once the sessions have been confirmed by a response from the load balancer, a permanent entry can be made in the table. This ensures that only valid sessions are placed in the session table, increasing the efficiency of the acceleration process.

39. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brendel et al. (US 5,774,660) in view of Masters (US 6,473,802).

40. With regard to claim 19, while the system disclosed by Brendel et al. shows substantial features of the claimed invention (discussed above), it fails to disclose that creating the entry comprises creating the entry using substantially only information in the received packet as it was received. Brendel et al. fail to disclose the specific components of session table entries.

Masters discloses the creation of entries in a session table consisting of a

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mapping between the IP address of the requesting client and the IP address of the destination server as being known in the art (Col 1, Lines 23-27). All subsequent packets from the same IP address will be routed to the same server. This is a simple method of tracking user sessions, requiring only information in the received packets in the state they are received.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a mapping between client IP addresses and destination servers. This is a well-known, simple method that does not require the addition of information to any packets. Since no additional information is added to the packets, there is no increase in overhead, maintaining the throughput of the network.

41. Claims 23,29,30,31,39,40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brendel et al. (US 5,774,660).

42. With regard to claim 23, while the system disclosed by Brendel et al. shows substantial features of the claimed invention (discussed above), it fails to disclose an additional load balancer using the same accelerator.

Brendel et al. disclose the presence of multiple load balancers for redundancy in case the primary load balancer fails (Col 18, Lines 44-54). However, since the accelerator functionality is integral to the load balancer, the load balancers do not share a single accelerator. It would be advantageous to separate the acceleration function from the load balancer nodes and place it in a separate node. This would allow multiple

load balancers to share a single accelerator and ensure that sessions are not accidentally assigned the same session ID.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to separate the accelerator functionality from the load balancer node and place it in a separate node. This would allow multiple load balancers to share a single accelerator, creating a single entry point into the network, and ensuring different sessions are not accidentally assigned the same session ID by different accelerators. This would prevent packets from being incorrectly routed to the wrong server.

43. With regard to claims 29, 30, and 31, while the system disclosed by Brendel et al. shows substantial features of the claimed invention (discussed above), it fails to disclose how the controller determines the field sets in which the data entries are stored.

However, it is clear that the method of determining the field sets in which to place the data entries does not affect the functionality of the invention. Any method that chooses the correct field sets to use for a particular application would be acceptable. In some applications, it would be advantageous to have a user interface through which a user may configure the desired field sets in order to give the system administrator more control over the acceleration process. In other applications, it would be advantageous to have the controller automatically determine the appropriate field sets by analyzing responses from the load balancer. For example, responses from the load balancer can

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be analyzed and it can be determined what mode the load balancer is operating in such as half NAT, full NAT, or triangulation.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any one of a plurality of methods for determining the field sets in which to store data entries. Different application can benefit from different methods of determining the appropriate field sets. A user interface provides more control over the acceleration process while automating the determination speeds up the process and reduces the need for user intervention.

44. With regard to claims 33,35 and 36, while the system disclosed by Brendel et al. shows substantial features of the claimed invention (discussed above), it fails to disclose that that the controller determines the field sets in which the data entries of the table are stored, such that at least during some periods of operation of the accelerator, the table includes at least two data entries stored in different field sets. Brendel et al. fail to disclose the specific components of entries in the table as well as the conditions under which they may change.

Brendel et al. discloses that the load balancer may operate in triangulation or half NAT mode. It is well known that theses two modes of operation perform different modifications to the packets that are received by the load balancer, in particular the destination address. As a result, the information located in the session table depends upon the mode the load balancer is operating in. The accelerator must be capable of creating entries for any possible operation mode of the load balancer. In the event that the accelerator services two or more load balancers, the accelerator must be capable of

creating entries of different types simultaneously, and having entries which use different field sets coexist in the table. It would be functionally equivalent to separate the entries for each load balancer into sub-tables having different field sets and store the sub tables as part of the table.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to ensure that the accelerator was capable of creating table entries for each mode of operation of the load balancer as well as maintaining entries for multiple load balancers operating in different modes simultaneously, either is one table or a plurality of sub tables. This allows a single accelerator to service multiple load balancers operating in different modes.

45. With regard to claim 34, while the system disclosed by Brendel et al. shows substantial features of the claimed invention (discussed above), it fails to disclose that at least one of the physical entries of the table can be configured for use with different field sets.

However, the primary difference between the different entry types is the addition of more fields to entries for load balancers operating in half NAT or full NAT mode. The information needed for accelerating a load balancer operating in triangulation mode is located in the entry for a load balancer operating in half NAT or full NAT mode. Therefore, a triangulation load balancer could use entries for a half NAT balancer by dropping the unnecessary fields when reading the table. Entries for a half or full NAT balancer could be converted to entries for a triangulation balancer when a balancer

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changes modes during operation. This would allow the acceleration to continue without losing any previously established sessions.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to allow a single physical entry to be configured for use with different field sets. This would allow the accelerator to adapt to a change in the mode of operation of the load balancer without causing any previously established sessions to fail.

46. With regard to claims 39, 40 and 41, while the system disclosed by Brendel et al. shows substantial features of the claimed invention (discussed above), it fails to disclose how the controller determines in which mode the forwarding unit operates.

However, it is clear that the method of determining the mode in which the forwarding unit operates does not affect the functionality of the invention. It would be advantageous to have the forwarding unit operating in the same mode as the load balancer. This would allow the network to continue functioning exactly as it did before the accelerator was installed. In some applications, it would be advantageous to have a user interface through which a user may configure the desired mode in order to give the system administrator more control over the acceleration process. In other applications, it would be advantageous to have the controller automatically determine the appropriate mode. This could be accomplished by examining the contents of the packets directed to/from the load balancer or by comparing the contents of packets directed to the load balancer to packets coming from the load balancer. For example, responses from the load balancer can be analyzed and it can be determined what mode the load balancer is

operating in such as half NAT, full NAT, or triangulation. The mode of operation of the forwarding unit could then be set accordingly.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any one of a plurality of methods for determining the mode of operation of the forwarding unit. Different application can benefit from different methods of determining the appropriate mode of operation. A user interface provides more control over the acceleration process while automating the determination speeds up the process, eliminates human error, and reduces the need for user intervention.

47. Claims 25,26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brendel et al. (US 5,774,660) in view of Cisco Systems in further view of Bayeh et al. (US 6,098,093).

48. With regard to claim 25, while the system disclosed by Brendel et al. in view of Cisco Systems shows substantial features of the claimed invention (discussed above), it fails to disclose that storing the identification information comprises storing a unique identification number tagged to the packet by the accelerator.

Bayeh et al. disclose the use of session identifiers as a means for uniquely identifying a session between a client and a server (Col 3, Lines 5-8). The server assigns a session ID to each new request from a client. On subsequent requests from the client, the session ID is sent as part of the packet and the server can identify the session that the packet belongs to. Once the session has been identified, the server can

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retrieve information associated with the session and act accordingly. It would be advantageous to use this feature for identifying clients connecting to a load balancer, since the sessions can be uniquely identified and routed to the appropriate server, maintaining session persistence.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use session identifiers as the entries in the session table disclosed by Brendel et al. The use of a session identifier allows sessions to be uniquely identified and properly routed to the correct server, maintaining persistence.

49. With regard to claim 26, Brendel et al. further disclose storing the identification information comprises storing at least one of the sequence and acknowledge fields of TCP packets (All SYN/ACK packets are stored) (Col 12, Lines 25-29).

50. With regard to claim 27, while the system disclosed by Brendel et al. in view of Cisco Systems shows substantial features of the claimed invention (discussed above), it fails to disclose that storing the identification information comprises storing a leading segment of the payload of the packet.

However, the purpose of storing identification information is to be able to uniquely identify the packet if it is received from the load balancer. It is important to use information in the packet that will not be changed by the load balancer before the response is sent. The load balancer would not modify the leading segment of the payload since it is essential that the payload be received at the server as the client sent it. Furthermore, it is unlikely that two received packets will have the same leading segment within the time it takes for a packet to travel to and from the load balancer.



This provides a reasonable certainty to the uniqueness of the leading payload segment as identifying information.

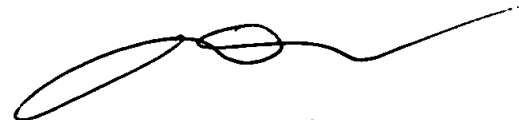
Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use the leading segment of the payload as an identifier for the packet. This method ensures that the identifier is not changed by the load balancer, and is unlikely to result in two different packets being identified as the same. Another advantage is that no additional identifying information needs to be attached to the packet, reducing overhead on the network.

51. The Office would like to note that the relevant reference titled "Configuring Accelerated Server Load Balancing" is an excerpt of "Catalyst 6500 Series Software Configuration Guide, 6.1". The cover page and copyright information for the guide have been included, as well as the relevant chapter 43. The entire guide is over 800 pages and will not be mailed due to its size, since it has not been used in any rejection. The guide is publicly available from Cisco Systems using Customer Order Number DOC-7811122 or via the Internet at [http://www.cisco.com/en/US/products/hw/switches/ps708/products\\_configuration\\_guide\\_book09186a008007fa24.html](http://www.cisco.com/en/US/products/hw/switches/ps708/products_configuration_guide_book09186a008007fa24.html)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron Strange whose telephone number is 703-305-8878. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Burgess can be reached on 703-305-4792. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Dung C. Dinh  
Primary Examiner